

## Identification of substitutional nitrogen and surface paramagnetic centers in nanodiamond of dynamic synthesis by electron paramagnetic resonance

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### Abstract

Production of nanodiamond particles containing substitutional nitrogen is important for a wide variety of advanced applications. In the current work nanodiamond particles synthesized from a mixture of graphite and hexogen were analyzed to determine the presence of substitutional nitrogen using pulsed electron paramagnetic resonance (EPR) spectroscopy. Nitrogen paramagnetic centers in the amount of 1.2 ppm have been identified. The spin relaxation characteristics for both nitrogen and surface defects are also reported. A new approach for efficient depletion of the strong non-nitrogen EPR signal in nanodiamond material by immersing nanodiamond particles into ice matrix is suggested. This approach allows an essential decrease of the spin relaxation time of the dominant non-nitrogen defects, while preserving the substitutional nitrogen spin relaxation time. Copyright © 2011 American Scientific Publishers. All rights reserved.

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### Keywords

Electron paramagnetic resonance, Nanodiamond, Substitutional nitrogen, Surface paramagnetic centers